

I claim:

- 1 1. A water-based drilling fluid having effective rheology comprising low
2 shear rate viscosity and effective fluid loss control properties comprising:
3 a quantity of water soluble polymer; and,
4 an amount of surfactant adapted to associate with said water soluble polymer
5 and to provide said effective rheology and effective fluid loss control
6 properties.
- 1 2. The water-based drilling fluid of claim 1 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.
- 1 3. The water-based drilling fluid of claim 1 wherein said low shear rate
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.
- 1 4. The water-based drilling fluid of claim 1 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase, said
3 quantity being sufficient to provide effective lubrication properties to said drilling
4 fluid.
- 1 5. The water-based drilling fluid of claim 2 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase, said
3 quantity being sufficient to provide effective lubrication properties to said drilling
4 fluid.
- 1 6. The water-based drilling fluid of claim 3 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase, said
3 quantity being sufficient to provide effective lubrication properties to said drilling
4 fluid.

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1 7. The water-based drilling fluid of claim 1 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl ether
3 sulfates, alkyl sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol
4 ethers, and phosphated esters comprising about 8 to about 18 carbon atoms, preferably
5 about 8 to about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 8. The water-based drilling fluid of claim 1 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1 9. The water-based drilling fluid of claim 1 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 10. The water-based drilling fluid of claim 1 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 11. The water-based drilling fluid of claim 3 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 12. The water-based drilling fluid of claim 3 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1 13. The water-based drilling fluid of claim 3 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 14. The water-based drilling fluid of claim 3 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 15. The water-based drilling fluid of claim 4 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl

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3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 16. The water-based drilling fluid of claim 4 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1 17. The water-based drilling fluid of claim 4 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 18. The water-based drilling fluid of claim 4 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 19. The water-based drilling fluid of claim 6 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 20. The water-based drilling fluid of claim 6 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates

1 21. The water-based drilling fluid of claim 6 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 22. The water-based drilling fluid of claim 6 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 23. The water-based drilling fluid of claim 1 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 24. The water-based drilling fluid of claim 2 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

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1 25. The water-based drilling fluid of claim 3 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 26. The water-based drilling fluid of claim 6 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 27. The water-based drilling fluid of claim 9 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 28. The water-based drilling fluid of claim 19 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 29. The water-based drilling fluid of claim 20 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 30. The water-based drilling fluid of claim 21 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 31. The water-based drilling fluid of claim 23 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 32. The water-based drilling fluid of claim 24 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 33. The water-based drilling fluid of claim 25 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 34. The water-based drilling fluid of claim 26 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

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1 35. The water-based drilling fluid of claim 27 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 36. The water-based drilling fluid of claim 28 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 37. The water-based drilling fluid of claim 29 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 38. The water-based drilling fluid of claim 30 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 39. The water-based drilling fluid of claim 30 wherein said effective fluid
2 loss control properties is a fluid loss of about 1 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 40. A water-based drilling fluid having effective rheology comprising low
2 shear rate viscosity and effective fluid loss control properties comprising:

3 a quantity of water soluble polymer;
4 an amount of surfactant adapted to associate with said water soluble polymer
5 and to provide said effective rheology and effective fluid loss control
6 properties; and
7 a concentration of non-toxic water emulsifiable material as an internal phase,
8 said surfactant being effective to emulsify said water emulsifiable

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9 material and to produce emulsion droplets having an average diameter
10 of about 30 microns or less.

1 41. The water-based drilling fluid of claim 40 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 42. The water-based drilling fluid of claim 40 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1 43. The water-based drilling fluid of claim 40 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 44. The water-based drilling fluid of claim 40 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 45. The water-based drilling fluid of claim 40 wherein said surfactant is
2 effective to emulsify said water emulsifiable material and to produce emulsion
3 droplets having an average diameter of about 20 microns or less.

1 46. The water-based drilling fluid of claim 40 wherein said surfactant is
2 effective to emulsify said water emulsifiable material and to produce emulsion
3 droplets having an average diameter of about 15 microns or less.

1 47. The water-based drilling fluid of claim 40 wherein said surfactant is
2 effective to emulsify said water emulsifiable material and to produce emulsion
3 droplets having an average diameter of about 5 microns or less.

1 48. The water-based drilling fluid of claim 40 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

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1 49. The water-based drilling fluid of claim 40 wherein said low shear rate
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1 50. The water-based drilling fluid of claim 47 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 51. The water-based drilling fluid of claim 40 wherein said concentration
2 is from about 2 to about 20 vol.%.

1 52. The water-based drilling fluid of claim 40 wherein said concentration
2 is about 5 vol.% .

1 53. The water-based drilling fluid of claim 47 wherein said concentration
2 is from about 2 to about 20 vol.%.

1 54. The water-based drilling fluid of claim 47 wherein said concentration
2 is about 5 vol.% .

1 55. The water-based drilling fluid of claim 40 wherein said non-toxic
2 water emulsifiable material is a water insoluble material selected from the group
3 consisting of olefins, paraffins, water insoluble glycols, water insoluble esters, water
4 insoluble Fischer-Tropsch reaction products, and combinations thereof.

1 56. The water-based drilling fluid of claim 40 wherein said water
2 emulsifiable material is a water insoluble material selected from the group consisting
3 of olefins, paraffins, water insoluble glycols, and combinations thereof.

1 57. The water-based drilling fluid of claim 47 wherein said water
2 emulsifiable material is a water insoluble material selected from the group consisting
3 of olefins, paraffins, water insoluble glycols, and combinations thereof.

1 58. The water-based drilling fluid of claim 40 wherein said fluid consists
2 essentially of additives other a solid bridging agent.

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1 59. The water-based drilling fluid of claim 48 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 60. The water-based drilling fluid of claim 49 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 61. The water-based drilling fluid of claim 50 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 62. The water-based drilling fluid of claim 40 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 63. The water-based drilling fluid of claim 58 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 64. The water-based drilling fluid of claim 59 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 65. The water-based drilling fluid of claim 60 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 66. The water-based drilling fluid of claim 61 wherein said effective fluid
2 loss control properties is a fluid loss of about 1 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 67. The water-based drilling fluid of claim 40 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and

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4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 68. The water-based drilling fluid of claim 40 wherein said quantity is at
2 least about 2 lb./bbl.

1 69. The water-based drilling fluid of claim 40 wherein said quantity is
2 about 7.5 lb.bbl.

1 70. The water-based drilling fluid of claim 48 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 71. The water-based drilling fluid of claim 48 wherein said quantity is at
2 least about 2 lb./bbl.

1 72. The water-based drilling fluid of claim 48 wherein said quantity is
2 about 7.5 lb.bbl.

1 73. The water-based drilling fluid of claim 59 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 74. The water-based drilling fluid of claim 59 wherein said quantity is at
2 least about 2 lb./bbl.

1 75. The water-based drilling fluid of claim 59 wherein said quantity is
2 about 7.5 lb.bbl.

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1 76. The water based drilling fluid of claim 40 wherein said amount is from
2 about 0.2 to about 4 lb./bbl.

1 77. The water based drilling fluid of claim 40 wherein said amount is
2 about 2 lb./bbl.

1 78. The water-based drilling fluid of claim 40 wherein said quantity is at
2 least about 2 lb./bbl.

1 79. The water-based drilling fluid of claim 40 wherein said quantity is
2 about 7.5 lb./bbl.

1 80. The water based drilling fluid of claim 58 wherein said amount is from
2 about 0.2 to about 4 lb./bbl.

1 81. The water based drilling fluid of claim 58 wherein said amount is
2 about 2 lb./bbl.

1 82. A water-based drilling fluid having effective rheology with low shear
2 rate viscosity and effective fluid loss control properties comprising:

3 at least about 2 lb./bbl. water soluble polymer; and,

4 at least about 0.2 lb./bbl. of a surfactant adapted to associate with said water
5 soluble polymer and to provide said effective rheology and fluid loss
6 control properties.

1 83. The water-based drilling fluid of claim 82 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

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1 84. The water-based drilling fluid of claim 82 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1 85. The water-based drilling fluid of claim 82 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 86. The water-based drilling fluid of claim 82 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 87. The water-based drilling fluid of claim 82 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 88. The water-based drilling fluid of claim 82 wherein said low shear rate
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1 89. The water-based drilling fluid of claim 83 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 90. The water-based drilling fluid of claim 84 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 91. The water-based drilling fluid of claim 85 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 92. The water-based drilling fluid of claim 86 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 93. The water-based drilling fluid of claim 82 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

1 94. The water-based drilling fluid of claim 83 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

1 95. The water-based drilling fluid of claim 84 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

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1 96. The water-based drilling fluid of claim 85 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

1 97. The water-based drilling fluid of claim 88 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

1 98. The water-based drilling fluid of claim 89 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

1 99. The water-based drilling fluid of claim 90 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

1 100. The water-based drilling fluid of claim 91 further comprising a
2 concentration of non-toxic water emulsifiable material as an internal phase.

1 101. The water-based drilling fluid of claim 93 wherein said concentration
2 is from about 2 to about 20 vol.%.

1 102. The water-based drilling fluid of claim 93 wherein said concentration
2 is about 5 vol.% .

1 103. The water-based drilling fluid of claim 97 wherein said concentration
2 is from about 2 to about 20 vol.%.

1 104. The water-based drilling fluid of claim 97 wherein said concentration
2 is about 5 vol.% .

1 105. The water-based drilling fluid of claim 100 wherein said concentration
2 is from about 2 to about 20 vol.%.

1 106. The water-based drilling fluid of claim 100 wherein said concentration
2 is about 5 vol.% .

1 107. The water-based drilling fluid of claim 88 wherein said fluid consists
2 essentially of additives other a solid bridging agent.

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1 108. The water-based drilling fluid of claim 87 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 109. The water-based drilling fluid of claim 88 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 110. The water-based drilling fluid of claim 89 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 111. The water-based drilling fluid of claim 90 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 112. The water-based drilling fluid of claim 91 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 113. The water-based drilling fluid of claim 92 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 114. The water-based drilling fluid of claim 107 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 115. The water-based drilling fluid of claim 108 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 116. The water-based drilling fluid of claim 109 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 117. The water-based drilling fluid of claim 110 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

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1 125. The water-based drilling fluid of claim 120 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 ~~126.~~ A water-based drilling fluid having effective rheology comprising low
2 shear rate viscosity and effective fluid loss control properties comprising:
3 about 7.5 lb./bbl. water soluble polymer; and,
4 about 2 lb./bbl. of a surfactant adapted to associate with said water soluble
5 polymer and to provide said effective rheology and fluid loss control
6 properties.

1 127. The water-based drilling fluid of claim 126 further comprising a
2 concentration of a water emulsifiable material as an internal phase.

1 128. The water-based drilling fluid of claim 126 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 129. The water-based drilling fluid of claim 126 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1 130. The water-based drilling fluid of claim 126 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 131. The water-based drilling fluid of claim 126 wherein said surfactant is
2 sodium tridecyl ether sulfate.

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1 132. The water-based drilling fluid of claim 127 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 133. The water-based drilling fluid of claim 127 wherein said surfactant is
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates

1 134. The water-based drilling fluid of claim 127 wherein said surfactant
2 comprises an alkyl ether sulfate.

1 135. The water-based drilling fluid of claim 127 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 136. The water-based drilling fluid of claim 126 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 137. The water-based drilling fluid of claim 127 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 138. The water-based drilling fluid of claim 134 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified

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3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 139. The water-based drilling fluid of claim 135 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 140. The water-based drilling fluid of claim 126 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 141. The water-based drilling fluid of claim 126 wherein said low shear rate
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1 142. The water-based drilling fluid of claim 126 wherein said low shear rate
2 viscosity is about 200,000 cP or more upon exposure to 0.3 rpm.

1 143. The water-based drilling fluid of claim 127 wherein said low shear rate
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 144. The water-based drilling fluid of claim 127 wherein said low shear rate
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1 145. The water-based drilling fluid of claim 140 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 146. The water-based drilling fluid of claim 141 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 147. The water-based drilling fluid of claim 142 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

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1 148. The water-based drilling fluid of claim 143 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 149. The water-based drilling fluid of claim 144 wherein said fluid consists
2 essentially of additives other than a solid bridging agent.

1 150. The water-based drilling fluid of claim 145 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 151. The water-based drilling fluid of claim 146 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 152. The water-based drilling fluid of claim 147 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 153. The water-based drilling fluid of claim 148 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 154. The water-based drilling fluid of claim 149 wherein said effective fluid
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard
3 dynamic filtration fluid loss test.

1 155. The water-based drilling fluid of claim 154 wherein said non-toxic
2 water emulsifiable material is a water insoluble material selected from the group
3 consisting of olefins, paraffins, water insoluble glycols, and combinations thereof.

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1 156. A water-based drilling fluid having effective rheology comprising low
2 shear rate viscosity and effective fluid loss control properties, and consisting
3 essentially of additives other than solid bridging agents, said drilling fluid comprising:

4 about 7.5 lb./bbl. water soluble polymer;

5 about 2 lb./bbl. of a surfactant adapted to associate with said water soluble

6 polymer and to provide said effective rheology and fluid loss control

7 properties; and

8 a concentration of a non-toxic water emulsifiable material as an internal

9 phase.

1 157. The water-based drilling fluid of claim 156 wherein said surfactant is
2 sodium tridecyl ether sulfate.

1 158. The water-based drilling fluid of claim 156 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 159. The water-based drilling fluid of claim 157 wherein said water soluble
2 polymer is selected from the group consisting of water soluble starches and modified
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and
4 water-soluble celluloses and modified versions thereof, and water soluble
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 160. The water-based drilling fluid of claim 156 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified

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4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 161. The water-based drilling fluid of claim 156 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 ~~162.~~ A water-based drilling fluid having effective rheology comprising low
2 shear rate viscosity and effective fluid loss control properties, and consisting
3 essentially of additives other than solid bridging agents, said drilling fluid comprising:
4 about 7.5 lb./bbl. of water soluble polymer comprising a combination of about
5 50 wt.% xanthan polysaccharide and about 50 wt.% synthetically
6 modified starch comprising one or more functional groups selected
7 from the group consisting of a carboxymethyl group, a propylene
8 glycol group, and an epichlorohydrin functional group;
9 about 2 lb./bbl. sodium tridecyl ether sulfate.

1 163. The water based drilling fluid of claim 162 further comprising a
2 concentration of a non-toxic water emulsifiable material as an internal phase.

1 164. The water-based drilling fluid of claim 156 wherein said non-toxic
2 water emulsifiable material is a water insoluble material selected from the group
3 consisting of olefins, paraffins, water insoluble glycols, water insoluble esters, water
4 insoluble Fischer-Tropsch reaction products, and combinations thereof.

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1 165. The water-based drilling fluid of claim 156 wherein said non-toxic
2 water emulsifiable material is a water insoluble material selected from the group
3 consisting of olefins, paraffins, water insoluble glycols, and combinations thereof.

1 166. The water-based drilling fluid of claim 163 wherein said non-toxic
2 water emulsifiable material is a water insoluble material selected from the group
3 consisting of olefins, paraffins, water insoluble glycols, and combinations thereof.

1 167. The water-based drilling fluid of claim 1 further comprising an alkali
2 metal salt of a compound selected from the group consisting of a thiosulfate and a
3 thiosulfonate.

1 168. The water-based drilling fluid of claim 40 further comprising an alkali
2 metal salt of a compound selected from the group consisting of a thiosulfate and a
3 thiosulfonate.

1 169. The water-based drilling fluid of claim 82 further comprising an alkali
2 metal salt of a compound selected from the group consisting of a thiosulfate and a
3 thiosulfonate.

1 170. The water-based drilling fluid of claim 125 further comprising an
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and
3 a thiosulfonate.

1 171. The water-based drilling fluid of claim 156 further comprising an
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and
3 a thiosulfonate.

1 172. The water-based drilling fluid of claim 162 further comprising an
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and
3 a thiosulfonate.

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1 173. The water-based drilling fluid of claim 126 further comprising an
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and
3 a thiosulfonate.

1 174. The water-based drilling fluid of claim 1 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 175. The water-based drilling fluid of claim 1 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 176. The water-based drilling fluid of claim 2 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 177. The water-based drilling fluid of claim 2 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

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1 178. The water-based drilling fluid of claim 6 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 179. The water-based drilling fluid of claim 6 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 180. The water-based drilling fluid of claim 10 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 181. The water-based drilling fluid of claim 10 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 182. The water-based drilling fluid of claim 40 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified

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4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 183. The water-based drilling fluid of claim 40 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 184. The water-based drilling fluid of claim 82 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 185. The water-based drilling fluid of claim 82 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 186. The water-based drilling fluid of claim 126 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 187. The water-based drilling fluid of claim 126 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and

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3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 188. The water-based drilling fluid of claim 156 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 189. The water-based drilling fluid of claim 156 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 190. The water-based drilling fluid of claim 162 wherein said water soluble
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified
4 starch comprising one or more functional groups selected from the group consisting of
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 191. The water-based drilling fluid of claim 162 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

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1 192. The water-based drilling fluid of claim 163 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 193. The water-based drilling fluid of claim 164 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 194. The water-based drilling fluid of claim 165 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

1 195. The water-based drilling fluid of claim 166 wherein said water soluble
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and
3 about 50 wt.% synthetically modified starch comprising one or more functional
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and
5 epichlorohydrin functional groups.

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